



Conference Abstract

# Virtual patient simulations for cardiology education and research: A CircAdapt perspective

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## Abstract

Nowadays cardiac simulations are becoming increasingly sophisticated. This trend, part of the maturing field of computational medicine, has provided medical students and cardiologists alike with a new tool for education and research – their very own virtual “patient”. The CircAdapt biophysical model of the human heart and circulation ([www.circadapt.org](http://www.circadapt.org)) allows the creation of a virtual “patient” for the study of the cardiovascular system and circulatory haemodynamics under diverse physiological and pathophysiological conditions in real time. The interactive CircAdapt model with its modular design based on established physical and physiological principles allows dynamic monitoring of blood flow velocities, pressures and volumes in the heart and blood vessels, and across valves and shunts. As an educational tool, the CircAdapt model enables medical students and residents in cardiology, neonatology and intensive care medicine to analyze complex situations while improving their comprehension of cardiovascular physics and (patho)physiology. Moreover, the CircAdapt model has been successfully utilized as a research tool for cardiac resynchronization therapy as well as for various cardiovascular pathologies (e.g. pulmonary arterial hypertension, LBBB). All in all the CircAdapt perspective is as follows: bridge education and research - from classroom to bedside – to foster the future of clinical practice.

## **Keywords**

Computational simulations, virtual patient, CircAdapt, cardiovascular system, haemodynamics

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